CLAIMS

1. An apparatus for identifying and quantifying components in an effluent stream from an ammoxidation reactor, comprising:

a microprocessor; and

a Fourier Transform infrared spectrometer having a sample cell through which may flow a portion of said effluent stream, an infrared source to emit infrared radiation and pass said infrared radiation through said effluent stream, an infrared detector to detect transmitted infrared radiation at selected infrared wavelengths and to generate absorbance data due to absorbance of said infrared radiation by said components, wherein each of said components absorbs infrared radiation at one or more of said infrared wavelengths, and an output apparatus to provide said absorbance data to said microprocessor;

wherein said microprocessor is programmed to identify and quantify each of said plurality of components based upon said absorbance data and calibration data, said calibration data being obtained from recovery run analyses and calibration analyses in said sample cell.

2. An apparatus as in claim 1, further comprising a memory device available to the microprocessor for storing said calibration data for each of the plurality of components.

3. An apparatus as in claim 1, further comprising an output device for outputting quantitative data for each of said plurality of components.

4. An apparatus as in claim 3, further comprising a reactor controller communicating with said ammoxidation reactor and said output device and adapted to adjust and control operation of said ammoxidation reactor based on said quantitative data.

5. An apparatus as in claim 4, wherein said reactor controller controls one or more of reactor temperature, reactor internal pressure, feed of air, feed of hydrocarbon and feed of ammonia.

6. An apparatus as in claim 5, wherein said reactor controller is controlled by said microprocessor.

7. An apparatus as in claim 1, further comprising a display for displaying data input to and output from said microprocessor.

8. An apparatus as in claim 2, wherein said calibration data provided to said memory device has been obtained from effluents from said ammoxidation reactor

9. An apparatus as in claim 1, wherein said ammoxidation reactor is operated to produce acrylonitrile.

10. A method for identifying and quantifying components in an effluent stream from an ammoxidation reactor, comprising:

(A) advancing a portion of said effluent stream through a sample cell in a Fourier Transform infrared spectrometer;

(B) scanning said portion in said sample cell with infrared energy at a plurality of infrared wavelengths, wherein each of said components absorbs said infrared energy at one or more of said plurality of selected wavelengths;

(C) detecting said infrared radiation passing through said sample cell and generating absorbance data for each of said components; and

(D) quantifying each of said components by comparing said absorbance data to a calibration curve for each component in a microprocessor programmed to quantify each of said components.

11. A method as in claim 10, further comprising outputting quantitative results for each of said plurality of components.

12. A method as in claim 11, wherein said quantitative data is output to a reactor controller communicating with said ammoxidation reactor and said reactor controller is adapted to adjust and control operation of said ammoxidation reactor based on said quantitative data.

13. A method as in claim 12, wherein said reactor controller is controlled by said microprocessor.

14. A method as in claim 12, wherein said reactor controller controls one or more of reactor temperature, reactor internal pressure, feed of air, feed of hydrocarbon and feed of ammonia.

15. A method as in claim 10, further comprising displaying data input to and output from said microprocessor.

16. A method as in claim 10, wherein said calibration curve is calculated from calibration data obtained by performing on effluents from said ammoxidation reactor recovery run analyses and calibration analyses in said sample cell, said calibration analyses performed using steps (A), (B) and (C)

17. A method as in claim 10, wherein said ammoxidation reactor is operated to produce acrylonitrile.

18. A method for controlling operation of an ammoxidation reactor based upon real-time quantitative analysis of components in an effluent stream from said ammoxidation reactor, comprising:

(a) preparing a calibration curve for each of said components by analyzing a plurality of effluent streams each containing said components by a calibration process comprising;

(a-1) advancing at least a portion of each said effluent stream through a sample cell in a Fourier Transform infrared spectrometer;

(a-2) scanning each said effluent stream advancing through said sample cell with infrared energy across a range of infrared wavelengths and obtaining absorbance data at selected wavelengths across said range of infrared wavelengths;

(a-3) collecting at least one sample corresponding to each said effluent stream;

(a-4) performing a recovery run analysis on said at least one sample to obtain quantitative data for each of said components in said at least one sample; and

(a-5) determining said calibration curve for each of said components by correlating said absorbance data and said quantitative data;

(b) obtaining real-time absorbance data for each of said components in an operational effluent from said ammoxidation reactor by performing steps (a-1) and (a-2) thereon and calculating in a microprocessor programmed therefor real-time quantitative data for said operational effluent from said calibration curve and said real-time absorbance data; and

(c) controlling by a reactor controller said ammoxidation reactor to optimize production of at least one of said components based on said real-time quantitative data.

19. A method as in claim 18, wherein said calibration is performed in a microprocessor programmed to prepare said calibration curve.

20. A method as in claim 18, further comprising outputting quantitative results for each of said plurality of components.

21. A method as in claim 18, wherein said quantitative data is output to a reactor controller communicating with said ammoxidation reactor and said reactor controller is adapted to adjust and control operation of said ammoxidation reactor based on said quantitative data.

22. A method as in claim 21, wherein said ammoxidation reactor controller is controlled by said microprocessor.

23. A method as in claim 18, wherein said ammoxidation reactor is operated to produce acrylonitrile.